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OVERPRESSURE VALVE FOR A PACKAGING CONTAINER

[0001] Background of the Invention

[0002] The invention relates to an overpressure valve for a packaging container, as generically defined by the preamble to claim 1.

[0003] One such overpressure valve for a packaging container is already known from German Patent Disclosure DE 35 21 373 A1; it comprises a base plate and a diaphragm extending over the base plate. Slitlike gas passage openings are embodied in the diaphragm which at an appropriate overpressure in the packaging container communicate with a through opening in the base plate and thus form a through conduit for the gas. The known overpressure valve for a packaging container is intended for being mounted on the outside of the packaging container.

[0004] More and more, there is a demand by packagers to dispose such overpressure valves on the inside of a packaging container, so that the overpressure valve is not visually so striking and moreover practically cannot be damaged from outside. Although the known overpressure valve of DE 35 21 373 A1 does advantageously have a very simple structure, nevertheless this reference makes no suggestions of how such an overpressure valve would have to be embodied so as to be attached to the inside of a packaging container.

[0005] Advantages of the Invention

[0006] The overpressure valve of the invention for a packaging container, having the definitive characteristics of claim 1, has the advantage that while being very simple and therefore economical to produce, it can be disposed on the inside of a packaging container.

[0007] Advantageous refinements of the overpressure valve for a packaging container of the invention are disclosed in the dependent claims. An especially low opening pressure of the overpressure valve can be attained if the at least one passage opening in the base plate takes the form of two intersecting circles. For joining the diaphragm to the base plate by a simple production process, in one advantageous version the diaphragm is embodied of two layers joined together; on one layer, an edge which extends all the way around is left free and is glued to the base plate. In another preferred version, the outer contours of the individual components of the overpressure valve are embodied essentially rectangularly, so that the overpressure valves can be formed by placing lengths of material one above the other; then the individual overpressure valves need merely be stamped out of the composite length of material, which produces relatively little waste.

[0008] Drawing

[0009] One exemplary embodiment of the invention is shown in the drawing and described in further detail below. Shown are:

[0010] Fig. 1, a cross section through an overpressure valve for a packaging container according to the invention which is disposed on the inside of a wall of packaging material;

[0011] Fig. 2, connecting elements shown in plan view, one being suitable for being glued to the inner wall of the packaging material and the other being suitable for ultrasonic welding;

[0012] Fig. 3, a plan view on a diaphragm;

[0013] Fig. 4, a side view of the diaphragm of Fig. 3; and

[0014] Fig. 5, a plan view on a composite length of material from which the individual overpressure valves can be separated.

[0015] Description of the Exemplary Embodiment

[0016] The overpressure valve 10 shown in Fig. 1 serves to conduct gas, present at overpressure in a packaging container, not shown, out of the packaging container so as to prevent the destruction of the packaging container. The overpressure valve 10 is preferably intended for use in coffee packages, where the packaging container is of flexible, hot-sealable packaging material. The overpressure valve 10 is secured to an inside 2 of a length of packaging material 1. Next, the packaging container in question, not shown, can be shaped from a portion of the length of packaging material 1 in such a way that the overpressure valve 10 is disposed, as mentioned, on the inside of the packaging container.

[0017] What is essential is that at least one venting capability, in the form of a hole 3 or at least one slit, is provided in the length of packaging material 1 in the region of the overpressure valve 10. The embodiment of such holes 3 or slits is already state of the art and will therefore not be addressed further here.

[0018] The overpressure valve 10 comprises three components: a base plate 12, a diaphragm 13, and a connecting element 14. The base plate 12, disposed on the side away from the inside 2 of the packaging material, has an approximately rectangular outer contour 15 in plan view and is preferably of PET (polyethylene terephthalate) with a thickness of approximately 200 μm . A passage opening 16 is embodied in the middle of the base plate 12, in the form of two intersecting circles 17, 18 (Fig. 5).

[0019] The diaphragm 13 is glued to the top side of the base plate 12, that is, the side toward the inside 2 of the packaging material. As shown in Figs. 3 and 4, the diaphragm 13

comprises two layers 20, 21. The outer contour 22 of the layer 20 facing away from the base plate 12 has the same shape and size as the outer contour 15 of the base plate 12. The layer 21 oriented toward the base plate 12 has a smaller size than the layer 20, such that between the two layers 20, 21 one above the other, an edge 23 which extends all the way around is formed in which only the layer 20 is present.

[0020] The two layers 20, 21 are joined together by means of an adhesive layer 25, which is applied to the full surface of the layer 20, so that the edge 23 likewise has the adhesive layer 25. In the region where the two layers 20, 21 overlap, there are elongated slits 27, 28, for instance two of them, spaced apart from one another in the diaphragm 13. The two slits 27, 28 may be produced by either a cutting or a stamping operation, but any other shape, number or size of slits or openings is conceivable. The two layers 20, 21 are likewise of PET, with a thickness of approximately 25 μm each, and the adhesive layer 25 has a thickness of approximately 20 μm . Because of its slight thickness, the diaphragm 13 has a certain flexibility or bendability perpendicular to the plane in which it extends.

[0021] In the region of the edge 23, the diaphragm 13 is joined by the adhesive layer 25 to the facing side of the base plate 12.

[0022] On the side toward the inside of the packaging material, the connecting element 14 is disposed on the diaphragm 13. The connecting element 14 is of PET, with a thickness of approximately 200 μm , and it has an outer contour 29 that corresponds to the outer contours 15, 22 of the base plate 12 and the diaphragm 13, respectively. Inside the connecting element 14, a rectangular recess 30 is embodied, which corresponds in shape and size approximately to those of the layer 21 of the diaphragm 13. The connecting element 14 is of PET, with a thickness of approximately 200 μm .

[0023] In a first version, shown in Fig. 2a, both the top and bottom sides of the connecting element 14 are provided with a respective adhesive layer 31, 32 over the full surface. While one adhesive layer 31 serves to join the connecting element 14 to the diaphragm 13, via the other adhesive layer 32 the connecting element 14 is glued over the full surface (except for the recess 30) to the inside 2 of the packaging material facing it.

[0024] In another version, shown in Fig. 2b, although there is again an adhesive layer 31, the top side of the connecting element 14, oriented toward the inside 2 of the packaging material, is provided with the rippling 34, so that joining the overpressure valve 10 to the inside 2 of the packaging material is done by means of an ultrasonic welding operation.

[0025] The overpressure valve 10 described thus far is especially suitable whenever relatively large-particle foods which produce gas during storage are packed in the packaging container. An example of this is whole coffee beans. Conversely, if a product with relatively fine particles is packed, such as ground coffee, then it is necessary to prevent the product from getting into the region of the passage opening 16. In that case, as shown in Fig. 1, an additional filter element 35 is joined over the full surface to the base plate 12, on the side of the base plate 12 remote from the diaphragm 13. The filter element 35 is embodied such that a passage of gas from the package interior into the passage opening 16 can take place, and for this purpose the filter element 35 may for instance comprise filter paper or nonwoven fabric or thin, perforated plastic material.

[0026] With respect to the function of the overpressure valve 10, it will be noted that gas produced in the package interior gets into the passage opening 16, possibly after passing through the filter element 35. At a defined overpressure of the gas, the diaphragm 13 gradually lifts away, creating a conduit for the gas between the passage opening 16 and the slit or slits 27, 28. Once the gas 10 has passed through the slits 27, 28, it reaches the environment through the hole 23. As soon as the overpressure in the package interior has

decreased because of the escape of the gas, the diaphragm 13 presses against the base plate 12 again and seals it off from the outside.

[0027] To improve the sealing of the diaphragm 13 with respect to the base plate 12, and in particular to prevent the entry of oxygen from the ambient air into the package interior, it is provided, as is widely done and well known and is therefore not shown, that a sealing agent, in particular silicone oil, be disposed between the diaphragm 13 and the base plate 12, in the region of the layer 21.

[0028] Such overpressure valves 10 described can be produced rationally and especially simply if they can be disposed directly adjacent one another from a composite foil and can then be separated or stamped out. For this purpose, Fig. 5 shows as examples of plurality of overpressure valves 10 disposed next to one another before they are separated from a composite film 36. The composite film 36 comprises a plurality of layers that respectively form base plates 12, diaphragms 13 and connecting elements 14.